

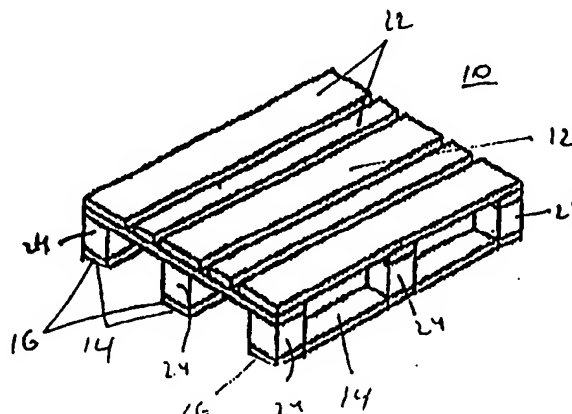
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US99/15283 <b>(22) International Filing Date:</b> 7 July 1999 (07.07.99)  <b>(30) Priority Data:</b> 09/120,285 22 July 1998 (22.07.98) US  <b>(71) Applicant (for all designated States except US):</b> GE POLYMER LOGISTICS LTD. [IL/IL]; Hamelacha Street 19, 48091 Rosh Haayin (IL).  <b>(71) Applicant (for TJ only):</b> FRIEDMAN, Mark, M. [US/IL]; Alharizi 1, 43406 Raanana (IL).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> FEINER, Gideon [IL/BE]; Vinklaan 8, B-2930 Brasschaat (BE).  <b>(74) Common Representative:</b> FRIEDMAN, Mark, M.; c/o Castorina, Anthony, Suite 207, 2001 Jefferson Davis Highway, Arlington, VA 22202 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** DUAL MATERIAL PALLET ASSEMBLY**(57) Abstract**

A pallet assembly (10) including a pallet top article (12) and a pallet bottom deck (14) being underneath and connected to said pallet top article (12), the pallet assembly (10) being made in part of a first material having an elastic module below 2000 megapascal and in part of a second material having an elastic module above 2000 megapascal.



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## DUAL MATERIAL PALLET ASSEMBLY

FIELD AND BACKGROUND OF THE INVENTION

The present invention relates to a pallet and, more particularly, to a  
5 pallet assembly made of two materials, each with different properties.

A pallet is a low platform on which goods are placed for storage or shipment. A conventional pallet is typically designed to be safely lifted and ported by a forklift. To this end, a conventional pallet typically includes spaces adapted for receiving the fork elements of a forklift.

10 Old pallets were typically made of wood. However, following the development of rigid plastic materials, and of plastic engineering nowadays most pallets are made of plastic materials.

A typical plastic pallet typically includes two elements. The first is a pallet top article which serves as a platform on which goods are placed,  
15 whereas the second is pallet bottom deck (also known in the art as base board), which is attached to the pallet top from underneath and which serves to provide the pallet as a whole with extra strength and rigidity.

Prior art plastic pallets are characterized in that they are made of a single plastic material. More rigid pallets are made of polycarbonate or  
20 polyphenilin derivatives, such as polyphenilin oxide and polyphenilin ether, having an elastic modulus in a range of 2200-3500 megapascal, whereas weaker pallets, which are designed to carry less weight, are made of poly

polyolefin, such as polyethylene or polypropylene having an elastic modulus in a range of 800-1500 megapascal.

Prior art plastic pallets made of a single material, polycarbonate, polyethylene or polypropylene are disclosed, for example, in U.S. patent  
5 Nos. 5,368,156 to Bruzzi et al., and 3,581,681 to Newton both teaching polycarbonate pallets; 3,680,495 to Pike, teaching a polyethylene or polycarbonate pallet; and 4,375,265 to van de Wetering et al. and 3,776,435 to Smith, both teaching polyethylene, polypropylene or polycarbonate pallets.

10 Polycarbonate and polyphenilin derivatives, however, are much more expensive as compared with polyethylene or polypropylene, yet a composite pallet, in which some parts are made of polycarbonate or polyphenilin derivatives, for extrarigidity, and other parts are made of polyolefin, for cost effectiveness, were never attempted, nor were they suggested by the  
15 prior art. For example, the market price of polyethylene or polypropylene is in a range of about U.S. \$ 0.6-1 per kilogram, whereas the market price of polycarbonate and polyphenilin derivatives is in a range of about U.S. \$ 2-3 per kilogram.

There is thus a widely recognized need for, and it would be highly  
20 advantageous to have, a pallet in which some parts are made of polycarbonate and/or polyphenilin derivatives for extrarigidity and other parts are made of polyolefin, for cost effectiveness

SUMMARY OF THE INVENTION

According to the present invention there is provided a pallet assembly comprising a pallet top article and a pallet bottom deck being underneath and connected to said pallet top article, the pallet assembly  
5 being made in part of a first material having an elastic module below 2000 megapascal and in part of a second material having an elastic module above 2000 megapascal.

According to further features in preferred embodiments of the invention described below, the pallet bottom deck is selected from the group  
10 consisting of a plurality of runners, a frame and framed runners.

According to still further features in the described preferred embodiments the pallet top article is made of the first material, whereas the pallet bottom deck is made of the second material.

According to still further features in the described preferred  
15 embodiments the first material is polyolefin.

According to still further features in the described preferred embodiments the polyolefin is selected from the group consisting of polyethylene and polypropylene.

According to still further features in the described preferred  
20 embodiments the second material is polycarbonate or polyphenilin derivative, such as polyphenilin oxide and polyphenilin ether.

According to still further features in the described preferred embodiments the pallet bottom deck is selected from the group consisting of a plurality of runners, a frame and framed runners.

The present invention successfully addresses the shortcomings of the presently known configurations by providing a pallet assembly which is comparable in strength to prior art sole polycarbonate pallets on one hand, yet is more cost-effectiveness therefrom, on the other hand.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention herein described, by way of example only, with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view from top of an exemplary two way pallet according to the present invention;

FIG. 2 is a perspective view from top of an exemplary four way pallet according to the present invention;

FIG. 3 is a perspective view from below of an exemplary two way pallet according to the present invention; and

FIG. 4 is a perspective view from below of an exemplary four way pallet according to the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is of a pallet assembly made of two materials, each with different properties, which can be used for storage and shipment of goods. Specifically, the present invention provides a pallet assembly which is rigid enough to replace the prior art sole polycarbonate or polyphenilin derivatives pallets yet includes polyolefin parts which render the pallet assembly cost-effectiveness.

The principles and operation of a pallet assembly according to the present invention may be better understood with reference to the drawings and accompanying descriptions.

Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments or of being practiced or carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein is for the purpose of description and should not be regarded as limiting.

Referring now to the drawings, Figures 1-4 are illustrative examples of two-way and four-way pallet assemblies according to the present invention, which are referred to hereinbelow as pallet assemblies 10.

Pallet assembly 10 includes a pallet top article 12 and a pallet bottom deck 14 being underneath and connected to pallet top article 12. According

to the present invention, pallet assembly 10 is made in part of a first material having an elastic module below 2000 megapascal and in part of a second material having an elastic module above 2000 megapascal.

According to the present invention pallet top article 12 is made of the first material, whereas pallet bottom deck 14 is made of the second material.  
The first material according to the present invention is polyolefin, such as, but not limited to, polyethylene and/or polypropylene. The second material according to the present invention is preferably polycarbonate and/or polyphenilin derivatives, such as, but not limited, to polyphenilin oxide and polyphenilin ether.

As specifically shown in Figures 1-2, pallet bottom deck 14 can be either a plurality of runners 16, a frame 18 or framed runners 20, attached to top article 12.

The specific design of top article 12 may vary to a great degree. In the examples shown in the drawings article 12 includes top runners 22 and legs 24. Top plates and top rib structures, as well as other designs are not excluded. In any case, as used herein in the specification and in the claims section below, the term "pallet top article" refers to the top and legs attached thereto.

Pallet's 10 dimensions are preferably as set forth in ISO 6780: 1988 (E), which is incorporated by reference as if fully set forth herein.



The growth and widespread usage of pallets throughout industry has led to the development of standards for pallet performance. ISO 8611: 1988 entitled "general-purpose flat pallets for through transit of goods - test methods", is an international recognized standard for flat-pallets performances. This standard, which is incorporated by reference as if fully set forth herein, describes a series of tests which rate a pallet's load bearing capacity, as well as defining a safe working load. The tests have their origin in practical experience and simulate operating realities. The following tests are applicable to plastic pallets: bending or racking test; base board or bottom deck test; inclined plane test; stacking test; and corner drop test.

The pallet assembly according to the present invention successfully passed these tests for grade N (normal grade pallets), as defined in ISO TR 10232, entitled "general-purpose flat pallets for through transit of goods - design rating and maximum working load", First Edition, November 1, 1989; and in ISO TR 10233, entitled "general-purpose flat pallets for through transit of goods - performance requirements", First Edition, November 1, 1989, both incorporated by reference as if fully set forth herein.

The pallet assembly according to the present invention is unique in that it is a composite pallet made of two materials with different properties. The first, being more rigid, serves to provide the pallet assembly with the required strength to render the pallet assembly according to the present

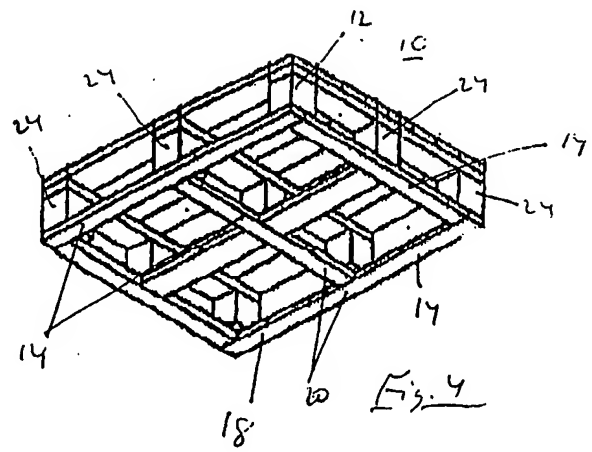
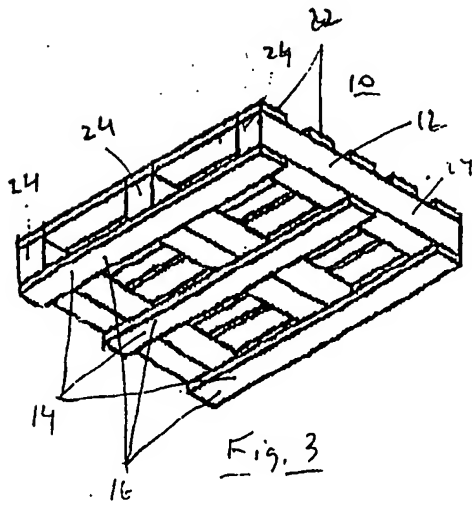
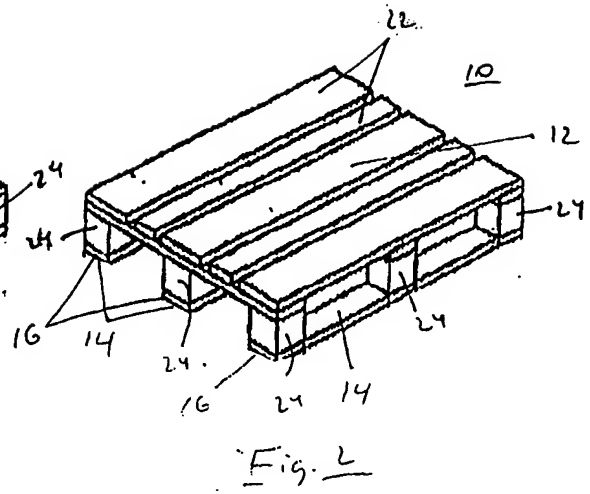
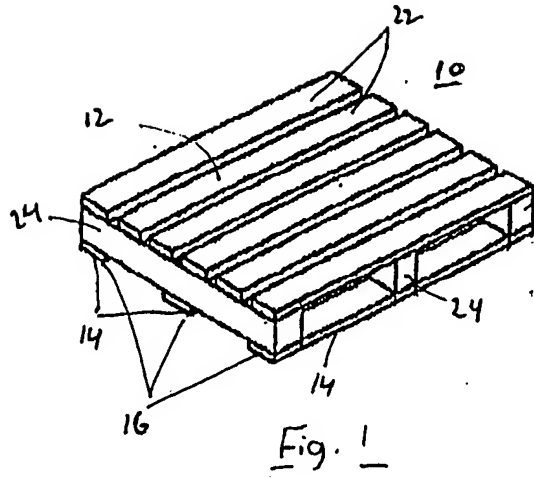
invention comparable in strength to sole polycarbonate pallets. The second material serves to render the pallet as a whole more cost-effectiveness as compared with sole polycarbonate or polyphenilin derivative pallets.

5        Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended  
10    claims.

## WHAT IS CLAIMED IS:

1. A pallet assembly liftable and portable by a forklift, the pallet assembly comprising a rigid pallet top article and a rigid pallet bottom deck being underneath and connected to said pallet top article, said pallet top article being made of a first material having an elastic module below 2000 megapascal and said pallet bottom deck being made of a second material having an elastic module above 2000 megapascal, wherein said pallet bottom deck is selected from the group consisting of a plurality of runners, a frame and framed runners.
2. The pallet assembly of claim 1, wherein said first material is polyolefin.
3. The pallet assembly of claim 2, wherein said polyolefin is selected from the group consisting of polyethylene and polypropylene.
4. The pallet assembly of claim 1, wherein said second material is selected from the group consisting of polycarbonate and polyphenilin derivative.

5. The pallet assembly of claim 2, wherein said second material is selected from the group consisting of polycarbonate and polyphenilin derivative.



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/15283

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(6) :B65D 19/00 US CL :108/57.25, 901 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 108/57.25, 901, 51.11, 13, 57.26, 57.27, 57.28, 902  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) APS; Search terms: pallet, polyolefin, polyethylene, polyphenilin.		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,351,628 A (BREEZER ET AL) 04 OCTOBER 1994, col. 5, lines 34-68.	1-5
A	US 4,649,007 A (BONIS ET AL) 10 MARCH 1987, col. 1, line 62, and col. 2, line 67.	1-5
A	US 3,581,681 A (NEWTON) 01 JUNE 1971, col. 2, lines 46-58.	1-5
A	US 5,492,069 A (ALEXANDER ET AL) 20 FEBRUARY 1996, see Abstract.	1-5
A	US 5,809,904 A (DARBY) 22 SEPTEMBER 1998, col. 4, lines 20-56.	1-5
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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